

3.8 GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

This section discusses greenhouse gas (GHG) emissions caused by proposed development of the West Village Expansion component of the 2018 LRDP. Emissions of GHGs have the potential to adversely affect the environment because they contribute, on a cumulative basis, to global climate change. This issue is, therefore, addressed as a cumulative impact issue because no single project produces enough GHG to alter climate change effects, but each project has the potential to contribute GHGs that ultimately concentrate in the globe's atmosphere and, from a global perspective, contribute to this growing problem.

Public comments on the NOP included concerns regarding the GHG impacts associated with growth planned under the 2018 LRDP, construction, and consistency with regional growth plans and the University's GHG reduction plans. Concerns related to growth focused on the potential for the 2018 LRDP to result in increased students and staff vehicles emissions due to having to live outside of the City of Davis due to limited housing availability on-campus and within the City. As they pertain to implementation of the West Village Expansion component of the 2018 LRDP, these impacts are described and addressed within this section.

3.8.1 Regulatory Setting

Plans, policies, regulations, and laws (applicable to and/or considered for the project) are provided in Volume 1 of this EIR. As the regulatory setting provided in Volume 1 considers potential development, including the West Village Expansion component, within the entirety of the UC Davis campus as envisioned through the 2018 LRDP, no additional regulatory setting is provided for the West Village Expansion component.

3.8.2 Environmental Setting

Refer to Section 3.8, "Greenhouse Gas Emissions and Climate Change," in Volume 1 of this EIR for a discussion of the regional environmental setting for the UC Davis campus, including the West Village Expansion site. Due to the global nature of climate change, the West Village Expansion, including the remote parking area, is similarly affected by climate change as for the entire campus. Section 3.8 of Volume 1 also discusses the scopes associated with different GHG emission sources. GHG emissions from the West Village Expansion and other public-private partnership projects are not included in UC Davis's GHG inventory.

3.8.3 Environmental Impacts and Mitigation Measures

SIGNIFICANCE CRITERIA

Refer to Section 3.8, "Greenhouse Gas Emissions and Climate Change," in Volume 1 of the 2018 LRDP for a discussion of applicable Significance Criteria.

ANALYSIS METHODOLOGY

Construction

Construction-related emissions of criteria air pollutants and precursors were calculated using the California Emissions Estimator Model (CalEEMod) Version 2016.3.2 computer program (SCAQMD 2017), as recommended by the Yolo Solano Air Quality Management District (YSAQMD). Modeling was based on project-specific information (e.g., land use types, traffic modelling, building sizes), where available, reasonable assumptions based on typical construction activities, and default values in CalEEMod that are based on the project's location and land use type. CalEEMod accounts for a variety of state, federal, and local programs and policies that affect construction-related emissions, such as local air district rules on architectural coatings and federal emission standards for off-road equipment, but these regulations primarily affect criteria pollutants. For a detailed description of model input and output parameters, and assumptions, refer to Appendix C in Volume 1.

Construction of the West Village Expansion component is assumed to start as early as September 2018 and last 24 months. Based on information provided in Chapter 2, "Project Description," of this volume, the West Village Expansion component would construct sufficient apartment units to support 3,800 student beds along with one acre of park space, approximately 1,000 vehicle parking spaces (800 spaces dedicated to installing canopy solar), and 3,800 bicycle parking spaces. An additional acre of paved roadway is assumed to be constructed as part of the infrastructure required for the West Village Expansion component. Using CalEEMod default occupancy rates for mid-rise apartments and a total of 1,300 dwelling units and 1,323,000 square feet (sf) of apartment space is assumed to be constructed under the West Village Expansion. The proposed remote parking area would add 20.4 acres of new pavement associated with new parking spaces. For a detailed description of model input and output parameters, and assumptions, refer to Appendix C.

Operation

Operation-related emissions of criteria air pollutants and precursors were calculated using CalEEMod Version 2016.3.2. Modeling was based on project-specific information (e.g., land use types, traffic modelling, building sizes), where available, reasonable assumptions based on typical construction activities, and default values in CalEEMod that are based on the project's location and land use type. The first full year of operation of the West Village Expansion component is assumed to begin in 2021. CalEEMod also accounts for policies that may affect operational emissions factors, such as state and federal vehicle emission standards and building energy efficiency standards, discussed further below. These policies are accounted for in modeling results, unless otherwise noted. For a detailed description of model input and output parameters, and assumptions, refer to Appendix C.

To estimate the electricity usage at the West Village Expansion, a comparison was made between the annual electricity use per unit at the current West Village development and the default energy use per unit for mid-rise apartment land uses under UC Davis's sustainability requirements. UC Davis requires that new buildings be 20 percent more efficient than the 2016 Building Energy Efficiency Standards under California Code of Regulations (CCR) Title 24 according the UC Sustainable Practices Policy (UC Office of the President [UCOP] 2016). The comparison between energy usage rates was made to determine which approach would result in the least electricity used per unit. The lowest electricity usage rates would then be applied to the residential land uses in the West Village Expansion.

To estimate the potential electricity usage rates of West Village Expansion under UC Davis's sustainability requirements, a 20 percent reduction was applied to the eligible energy usage defaults modeled in CalEEMod version 2016.3.2 (SCAQMD 2017). CalEEMod estimates that, for a mid-rise apartment complex in Yolo County built to the 2016 Building Energy Efficiency Standards, each apartment unit would use 4,256 kilowatt hours (kWh) of electricity and 97 therms of natural gas per

year. Of these energy default usages 461 kWh of electricity and 71 therms of natural gas per year are considered to be from Title 24-eligible applications, such as heating, ventilation, and cooling. Energy usage associated with “plug-in” devices, such as electronics and small appliances, are exempt from the state’s Building Energy Efficiency Standards. Thus, under UC Davis’ sustainability requirements, an average mid-rise apartment unit, as modeled by CalEEMod, would use 4,164 kWh of electricity per year and 83 therms of natural gas per year. This energy demand profile is approximately equivalent to 6,607 kWh of electricity per unit per year, assuming electric appliances are used in place of natural gas ones.

By contrast, current student apartments at the West Village development use an average of 9,619 kWh per unit, inclusive of all sources of energy demand including those in shared common areas within the apartment buildings, according to the UC Davis West Village Energy Initiative Annual Report 2013-2014 (UC Davis 2014). Thus, the residential energy usage rates of the current West Village development (9,619 kWh/unit/year) would be higher than if similar land uses were to meet the minimum UC Davis sustainability requirements for energy efficiency (6,607 kWh/unit/year). As such, the West Village Expansion is assumed to use 6,607 kWh per year for each of the proposed apartment units. Energy use in other non-residential areas within the project, such as outdoor lighting, was estimated using defaults in CalEEMod. See Appendix C of Volume 1 for further details on this calculation.

The estimated energy efficiency rate of the project is assumed to help UC Davis implement its Green Building practices under the U.S. Green Building Council’s Leadership in Energy and Environmental Design program (LEED). UC Davis is targeting to achieve LEED Gold Certification for all renovated and new buildings, including the West Village Expansion component. A variety of measures can be applied to achieve LEED Gold status, including increased energy efficiency standards over state requirements.

With respect to emissions from electricity use, UC Davis procures its electricity from the Western Area Power Association (WAPA), a federally-run utilities company that markets and transmits wholesale electricity from multi-use water projects (hydropower). UC Davis contracts with WAPA for both base resource power (hydrogeneration power) and custom product power. WAPA’s supply of hydropower is contingent upon atmospheric conditions and precipitation events, and therefore varies widely year to year. Due to the inherent uncertainty of hydropower availability, WAPA procures through the open market on behalf of UC Davis to supplement power requirements contracted by UC Davis. As such, WAPA-specific emissions factors are not available. Therefore, indirect, electricity-related operational emissions of GHGs for the existing site and component were calculated using emissions factors generated by the EPA’s Emissions and Generation Resource Integrated Database for the WECC California subregion CAMX factor. As recommended by EPA, annual non-baseload output emissions rates were used to calculate the GHG emissions associated with electricity use for the existing and future conditions of the site (EPA 2014). It should be noted that indirect emissions of GHGs associated with the existing site and component do not reflect use of hydropower, which has an emissions factor of zero for CO₂; therefore, estimates are conservative.

With respect to emissions offsets from solar electricity generation, WAPA emission factors were applied to the estimated electricity generation. On-site solar electricity generation was based off generation rates typical to the Sacramento region using default values in the National Research Energy Laboratory’s (NREL) PV Watts Calculator web tool (NREL 2018). Assuming a standard module type, fixed array, a 20 percent tilt, and a commercial-type array, a 1-megawatt (MW) solar system would generate 1,535 megawatt-hours (MWh) per year on a 1.45-acre footprint. This result was scaled to the West Village Expansion’s available rooftop and parking canopy space assuming 20 percent of the space is taken up by solar thermal water heating and other rooftop structures or utilities. Assuming 400 sf per parking space and 800 spaces dedicated to installing canopy solar, a total of 320,000 sf would be available for solar installation from parking canopies. For rooftop solar

space, West Village Expansion's square footage (1,323,000 sf) was divided by the maximum number of stories (six) to give a total of 176,400 sf of available rooftop space for solar.

With respect to mobile sources, California Air Resources Board's (CARB) emission factor model (EMFAC) (v. EMFAC2017), was used to estimate annual GHG pollutant emissions from VMT generated by the West Village Expansion, which was available from the traffic analysis included as Appendix H and prepared for the West Village Expansion component by Fehr and Peers (CARB 2017). EMFAC2017 is CARB's latest update to the EMFAC model series and considers effects of future policies and economic forecasts. The modeled emission factors reflect Yolo County's vehicle mix and usage rates forecast for 2021, which is the first full year of operation for the West Village Expansion. Fehr and Peers provided daily VMT estimates for the West Village Expansion component and apportioned the VMT by speed bin and three general vehicle categories (passenger cars and light duty trucks, trucks with two axles, and trucks with three axles or more). These three vehicle categories were matched to EMFAC's vehicle categories based on the general vehicle category descriptions; and the daily VMT estimates were converted to annual levels based on a calculated factor of 287 academic-day equivalents per year (see Appendix C for details). The VMT estimates only include on-road vehicle trips beginning and ending in the UC Davis campus (Behrens, pers. comm., 2018). To estimate the emissions attributable to the West Village Expansion, calendar year 2021 emission factors from EMFAC2017 were applied to the new VMT associated with the West Village Expansion. See Appendix C for the vehicle category matches, emission factors, VMT, and emission calculation details, including estimates for the 2016 existing conditions.

The West Village Expansion component is expected to plant result in new tree plantings of approximately 588 new trees. This quantity is based on a cursory review of the current tree density on campus of approximately 20 trees per acre, excluding parking lot acreage. The change in carbon sequestration potential was analyzed using CalEEMod's vegetation module.

ISSUES NOT EVALUATED FURTHER

The following impacts were identified as part of the analysis of the 2018 LRDP, and are either (1) adequately evaluated at the program level of analysis of the 2018 LRDP, or (2) not applicable to the project.

Considerable Contribution to Climate Change

Impact 3.8-1 of Volume 1 of this EIR evaluated the potential increase in GHG emissions associated with the 2018 LRDP, including the project-level analysis of both the West Village Expansion and Orchard Park Redevelopment components. The results of the modeling conducted, including those from the West Village Expansion, are presented in Table 3.8-5 of Volume 1 of this EIR. Based on the analysis conducted, the 2018 LRDP, including both the West Village Expansion and Orchard Park Redevelopment components, would result in a net reduction of emissions, equivalent to 59 percent below 1990 levels by 2030. This would achieve the UC and state goals of reducing emissions to 40 percent below 1990 levels by 2030 and would not impede the state goal of achieving statewide emissions equivalent to 80 percent below 1990 levels by 2050. Therefore, the West Village Expansion component of the 2018 LRDP would be consistent with statewide GHG reduction goals and would not considerably contribute to climate change. This impact would be less than significant and no additional project-specific analysis is required.

Conflict with Plans, Policies, Regulations Intended to Reduce Greenhouse Gas Emissions

As noted above and in Impact 3.8-1 of Volume 1 of this EIR, the West Village Expansion component of the 2018 LRDP would not prevent UC Davis from achieving reduction targets, established by the UC Sustainable Practices Policy. Further, in doing so, the West Village Expansion component would

not impede the ability of the region and the state to achieve targets established through regional and statewide planning efforts and regulations. Therefore, the West Village Expansion component would not conflict with applicable plans, policies, or regulations intended to reduce GHG emissions. No impact would occur and no additional project-specific analysis is required.

PROJECT-SPECIFIC IMPACTS AND MITIGATION MEASURES

Consistent with the GHG analysis in Volume 1 of this EIR, there are no potentially significant impacts identified related to GHG emissions for the West Village Expansion component of the 2018 LRDP. No project-specific mitigation is necessary.

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